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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,888	02/13/2002	Benjamin C.E. Schwarz	5298-06900 PM01027	6502

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EXAMINER	
DEO, DUY VU NGUYEN	
ART UNIT	**PAPER NUMBER**
1765	

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding..

Office Action Summary	Application No.	Applicant(s)
	10/074,888	SCHWARTZ ET AL.
	Examiner	Art Unit
	DuyVu n Deo	1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 2/13/02.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 13 December 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) filed 2/13/02
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1- 9, 11-17, 19-24, 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsiao (US 6,444,584).

Hsiao describes a method for fabrication a semiconductor device comprising etching a stack of layers within a single etch chamber (col. 6, line 64-66), wherein the stack of layers comprising a silicon nitride layer 14 interposed between an organic anti-reflective 18 and underlying layer 12 (col. 5, line 21, 47, 56, 65) and using argon during etching of the stack (col.

7, line 9). This would read on claimed introducing a noble gas heavier than helium into the etch chamber during the etching of the anti-reflective, nitride, and underlying layer.

Referring to claims 8 and 9, the underlying layer including but not limited to monocrystalline silicon and polysilicon (col. 5, line 30-32).

Referring to claim 11, the anti-reflective 18 are etched in the chamber that also designed to etch the silicon (col. 6, line 65, 66).

Referring to claims 12-14, 16, 17, the method comprises of continuously etching the stack of layers including ARC, nitride (cap layer), and silicon (lower layer) using etchant gas including Ar. The etchant gas must be kept introducing into the chamber for the etching one layer after another. As Ar must be kept introduced when the cap and lower layer are etched, this would read on claimed of introducing the second and third noble gas heavier than helium into the chamber during etching of the cap and lower layer.

Referring to claim 15, the method further comprising patterning a photoresist layer arranged over the anti-reflective (ARC) layer prior to etch the ARC layer (col. 6, line 30-35) and removing the remaining portions of the photoresist and the ARC layer after etching the nitride (cap layer) (col. 7, line 20-42). This would read on claimed removing the removing the remaining portions of the photoresist and the ARC layer subsequent to etching the nitride (cap layer)

Referring to claims 19-21, the etching would also reduce the formation of defects within an etched portion of the nitride and polysilicon bilayer mounds. Support for presumption is found by the fact that the etchant gas includes Ar, which is the same as claimed noble gas

heavier than helium. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 205 USPQ 594.

Referring to claims 23, 24, and 27, the gate electrode are formed within linewidth of 0.1-3.0 um (col. 9, line 30-42; col. 10, line 63). This linewidth would read on claimed critical dimension specification. Furthermore, the etch chamber would have to be adapted to form dimension of the gate electrode within this critical dimension specification since it is used to etch to form gate electrode with this linewidth.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 10, 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsiao.

Referring to claim 10, Hsiao doesn't describe the underlying layer is silicon-germanium. However, at the time of the invention was made it would have been obvious to one skill in the art that Hsiao's method can be applied to etch silicon-germanium because he teaches that the silicon materials etched are not limited to monocrystalline silicon and polysilicon (col. 5, line 29-33).

Referring to claims 25 and 26, Hsiao also teaches that his method is not limited to form gate structure (col. 4, line 38-42). Therefore, it would have been obvious for one skill in the art at the time of the invention to form other semiconductor structure such as claimed interconnect line or isolation region depending on the structure being desired with a reasonable expectation of success.

5. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsiao as applied to claim 11 above, and further in view of Khajehnouri et al. (US 6,117,786).

Referring to claim 18, Hsiao doesn't describe using the noble gas such as xenon. However, he teaches of using carrier gas and xenon is known as a carrier gas in the etching process of semiconductor devices as shown here by Khajehnouri (col. 2, line 18-20). Therefore, at the time of the invention, using xenon would be obvious to one skill in the art in order to provide a carrier gas for the etching with a reasonable expectation of success.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 12 recites the limitation "said etching the nitride layer" in line 21. There is insufficient antecedent basis for this limitation in the claim.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 571-272-1462.

DVD
1/27/04